

**WHAT IS CLAIMED IS:**

1. A system for scanning both sides of a two sided specimen, comprising:

5 a light energy generating device;

a collimator for collimating light energy received from said light energy generating device into two separate channels;

10 a diffraction grating for receiving light energy transmitted from each channel of said collimator and passing nonzero order light energy toward said specimen;

at least one reflective surface for receiving light energy from said diffraction grating;

15 a second diffraction grating for receiving light reflected from said specimen and from each reflective surface;

at least one receiving collimator for receiving light energy from said second diffraction grating; and

20 at least one camera for receiving light energy from each receiving collimator.

2. The system of claim 1, wherein said reflective surface receives nonzero order light energy passed from said diffraction grating.

25 3. The system of claim 1, further comprising a blocking element for blocking passage of zero order light energy received from said diffraction grating.

30 4. The system of claim 1, further comprising a calibration element, wherein said calibration element is employed in place of said two sided specimen to calibrate the system and said two sided specimen is scanned subsequent thereto.

5. The system of claim 1, wherein each camera converts an elliptical image of at least one side of said specimen into an image having an aspect ratio closer to 1:1.

5 6. The system of claim 1, wherein each receiving collimator comprises at least one lens.

7. The system of claim 1, wherein nonzero order light energy passes from said diffraction grating toward at least one reflective surface and said specimen.  
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8. The system of claim 1, wherein at least one reflective surface is semitransparent, and said system further comprises an interferometric normal incidence inspection device.

15 9. The system of claim 8, wherein said interferometric normal incidence inspection device comprises a light emitting device, a beamsplitter, and a collimator.

10. The system of claim 1, wherein said first diffraction grating is optimized for zero intensity of its zero order.  
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11. A method for inspecting both sides of a dual sided specimen simultaneously, comprising the steps of:

25 transmitting light energy toward said specimen;  
diffracting said light energy into nonzero order light energy;

directing said diffracted light energy toward said specimen and toward a reflective surface mounted substantially parallel to said specimen;  
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receiving nonzero order light energy reflected from said specimen and said reflective surface and combining the received light energy; and

directing said light energy to a light receiving  
5 device.

12. The method of claim 11, wherein said diffracting step comprises diffracting for zero intensity of the zero order of the light energy received.

10 13. The method of claim 11, further comprising the step of initially calibrating the system prior to said transmitting step.

14. The method of claim 11, further comprising the step of performing an interferometric normal  
15 incidence inspection on the specimen prior to said transmitting step.

15 15. The method of claim 11, further comprising the step of performing an interferometric normal incidence inspection of the specimen after said  
20 directing step.

16. The method of claim 11, wherein said light energy forms an image, and said directing step comprises altering the image aspect ratio.

17. An apparatus for inspecting both sides of a  
25 two sided specimen, comprising:

an energy transmitting device;

a light energy splitting device for isolating nonzero order components of light energy received from said energy transmitting device; and

30 at least one reflecting surface mounted substantially parallel to said specimen and receiving

nonzero order energy from said light energy splitting device;

wherein said light energy splitting device directs nonzero energy simultaneously toward one reflecting surface and one surface of said two sided specimen.

18. The apparatus of claim 17, wherein said light energy splitting device directs said nonzero components of light energy toward said two sided specimen and at least one said reflecting surface.

19. The apparatus of claim 17, wherein at least one reflecting surface is semi transparent.

20. The apparatus of claim 17, further comprising an interferometric normal incidence inspection device.

21. The apparatus of claim 19, wherein said interferometric normal incidence device comprises a beamsplitter and a collimator.

22. The apparatus of claim 17, further comprising a blocking surface for blocking zero order components from said light energy splitting device.

23. The apparatus of claim 17, further comprising a camera arrangement, said camera arrangement receiving an image at a first aspect ratio and recording said image at a second aspect ratio.

24. An object for calibrating a dual sided specimen inspection system, comprising:

a predetermined pattern on a first side of said object; and

a substantially identical pattern to said predetermined pattern on a second side of said object.

25. The object of claim 24, wherein said predetermined pattern comprises circular raised features.